

Serial No. 10/029,253
Amdt. dated October 4, 2004
Reply to Office Action of June 3, 2004

Docket No. K-0381

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the final discussion as respectfully requested.

Claims 1-16 are pending in a present application with claims 1, 2, 6, 9, 12 and 15 having been amended by the present amendment.

In the outstanding Office Action, the drawings were objected to; the specification was objected to; many of the claims were rejected under 35 U.S.C. § 112, first and second paragraphs; claims 1, 5 and 11 were rejected under 35 U.S.C. § 102(e) as anticipated by Kelkar et al.; and claims 8-10 and 14-16 were rejected under 35 U.S.C. § 103(a) as unpatentable over Kelkar et al. in view of Mihara.

Regarding the objection to the drawings, Figure 1 has been amended to include a label "background art" in light of the comments noted in the Office Action. Further, the specification has been amended to include reference numerals 101, 102 and 103 shown in Figure 2. Regarding Figure 3, the Office Action indicates the decision boxes 203 include the same function and thus there is no difference. It is respectfully noted the boxes 203 have been amended to indicate whether puncturing or repeating is performed.

Accordingly, it is respectfully requested the objection to the drawings be withdrawn.

Further, the specification at pages 5 and 6 have been amended in light of the comments noted in the outstanding Office Action. Regarding paragraph [0032], the Office Action indicates

that it is not sure what takes place for “puncturing” and what takes place for “repeating.” The following explanation is provided to assist in the explanation of puncturing and repeating bits.

The number of bits punctured (i.e., deleted) or repeated (added) correspond to the process of rate matching. In more detail, the number of bits on a transport channel can vary with every transmission time interval (TTI). However, the physical channel radio frames must be completely filled. This means that some sort of adjusting must be done to match the two given rates. In the uplink, the total bit rate after transport channel multiplexing must match the total physical channel bit rate. This is done by either repeating or puncturing bits. There are special rules for what bits can be punctured and what bits cannot be punctured. Puncturing means that bits are deleted from the output stream according to a predefined scheme. It is possible to puncture some bits as this process will be done after channel coding, which had already redundancy to the code. In the downlink, the network can interrupt the transmission if the number of bits to be sent is lower than the maximum available. This is called the discontinuous transmission (DTX) mode, and it is done to reduce the overall interference in the radio path. Rate matching is needed in the downlink to determine how many DTX bits need to be transmitted.

For example, assume the transport channel includes 32 coded bits, but the physical channel can only transmit 30 bits. In this case, 2 bits would have to be punctured to match the different rates. Further, enclosed is a copy of a technical specification 3GPP TS 25.212, which

includes definitions related to rate matching, e_{ini} , e_{plus} , e_{minus} , etc. Section 4.27 at page 23 of the enclosed technical specification describes in general rate matching and defines in one example the variables e_{ini} , e_{plus} , e_{minus} , etc. (see 4.2.7.1.2.1). Accordingly, in light of the above comments, it is respectfully requested the objection to the specification be withdrawn.

Regarding the rejections of the claims under 35 U.S.C. § 112 first and second paragraphs, the Office Action indicates the “initial error value”, e_{plus} and e_{minus} is not defined in the specification nor has its function been explained. It is respectfully noted these values are predetermined and are used to determine which bits are punctured or repeated (as noted above). The enclosed 3GPP technical specification 25.212 V 3.4.0 defines different example values for these variables. The values depend on different features such as whether conventional coding or turbo encoding is used. Note pages 28 and 29 give different definitions for these values, which are used to determine what bits are punctured or repeated so as to perform rate matching. Note also that section 4.2.7.5 at pages 39 and 40 illustrate the rate matching pattern determination shown in the background art of Figure 1 of the present invention. Thus, the values e_{ini} (initial error value), e_{plus} and e_{minus} are predetermined based on the type of coding, whether it's downlink or uplink, etc. and then these values are used to determine which bits are punctured or repeated to perform rate matching. Note, the present specification also indicates the values e_{ini} , e_{plus} and e_{minus} are initially given (see paragraph [0027] at page 10).

In addition, some of the dependent claims further define how the incremental value is calculated. For example, dependent claim 2 recites that the method calculates a modular K , which as shown in dependent claim 3 is also used in determining the incremental error value. Thus, because the terms e_{plus} and e_{minus} are initially given, the modular K may be determined. For example, if e_{plus}/e_{minus} is greater or equal to 1, the integer value of e_{plus}/e_{minus} is selected as the modular K . If, as shown in dependent claim 2, e_{plus}/e_{minus} is less than 1, the integer value of e_{minus}/e_{plus} is selected as the modular K . Dependent claim 3 uses the modular operator K in calculating the incremental error value defined in independent claim 1.

Further, regarding the subject matter recited claims 9 and 15, the Office Action indicates the term " $PBR_{i\%K}$ " of the claims is not define in the specification nor has its function been explained. It is respectfully noted this feature is described in detail at pages 11 and 12 in paragraphs [0034] and [0035]. In fact, [0035] gives an example of this feature.

Accordingly, in light of the above comments, as respectfully requested the rejection of the claims under 35 U.S.C. § 112, first and second paragraph should be withdrawn.

Claims 1, 5 and 11 stand rejected under 35 U.S.C. § 102(e) as anticipated by Kelkar et al. This rejection is respectfully traverse.

The present invention determines an original initial error value (e_{ini}), which is originally given for a rate-matching algorithm generating a rate-matching pattern for the hybrid ARQ system, and calculating an incremental error value that depends on a number of retransmissions

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made. Further, a new initial error value is calculated by adding the incremental error value with the original initial error value. The new initial error value is used to determine puncturing or repeating bit positions of a data frame. Thus, according to the present invention, the system is able to give priorities to the data bits transmitted fewer times (see paragraph [0025] at page 10).

On the contrary, Kelkar et al. is merely directed to changing error rate conditions by adjusting N to a value that realizes the best data throughput for the changed conditions (N is a number of subframes). See Figure 4, for example and columns 3, lines 1-8. However, Kelkar et al. does not puncture or repeat bits of a frame and does not calculate a new initial error value based on a number of retransmissions made along with an initial error as claimed by the present invention.

Accordingly, as respectfully submitted independent claims 1, 5 and 11 and each claims depending therefrom patenably define over Kelkar et al.

Further, it is respectfully submitted the additional rejection noted in the Outstanding Office Action has also been overcome as the claims rejected therein are dependent claims.

CONCLUSION

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. If the Examiner believes that any additional changes

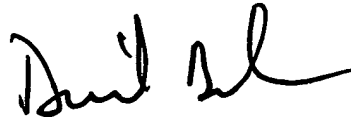
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would place the application in better condition for allowance, the Examiner is invited to contact the undersigned attorney, **David A. Bilodeau**, at the telephone number listed below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
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